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EXAMINER	
WANG, GEORGE Y	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 022004

Application Number: 09/488,149
Filing Date: January 20, 2000
Appellant(s): SORIN ET AL.

Mark A. Wilson
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 2, 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 1-3, 11, 14, and 15 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. The rejection of claims 4 and 12 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,365,335	Sorin	11-1994
4,553,264	Hasegawa	11-1985
4,048,573	Evans	9-1977

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims rejected under 35 USC § 103. This rejection is set forth below.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-4, 11-12, and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (Applicant's Admission of Prior Art) and Sorin (U.S. Patent No. 5,365,335) in view of Hasegawa et al. (U.S. Patent No. 4,553,264, hereinafter "Hasegawa") and Evans et al. (U.S. Patent No. 4,048,573, hereinafter "Evans").

AAPA (pg. 1, lines 14-31) and Sorin discloses a device and method of monitoring an optical signal utilizing a heterodyne detection (fig. 3, ref. 200) comprising steps of

providing an input signal (fig. 3, ref. 214), a local oscillator signal (fig. 3, ref. 220), combining them (fig. 3, ref. 216), detecting the combined signal (fig. 3, ref. 12) of heterodyne, intensity and shot noise, and generating an output signal that is indicative of an optical parameter of input signal and includes monitoring a heterodyne signal. Sorin discloses an attenuator (fig. 3, ref. 240) that utilizes information from a feedback circuit (col. 2, lines 38-43) from the output to validate noise reduction via electronic and optical processing.

However, AAPA and Sorin fail to disclose an attenuator positioned before heterodyne signal combination.

Hasegawa discloses a heterodyne tuner with an attenuator positioned immediately after the input (fig. 8, ref. 62).

Evans discloses amplification improvements that include attenuation at the input (fig. 1; abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have positioned the attenuator of Sorin immediately after the input port and before the signal combination as suggested by Hasegawa since the noise intensity from the input signal is usually a dominant noise source (fig. 8, ref. 62). Although the placing the attenuator immediately following the input signal achieves the same functional purpose as placing it after the coupler to provide attenuation feedback, it is clear that placing it at the site of dominant noise generation would render it more advantageous and beneficial because attenuators are well known in the art and are widely used to reduce noise levels. Therefore, maximizing signal to noise ratio at the

dominant noise source would have been obvious to do for any optical system (Evans, abstract).

(11) Response to Argument

Appellant's main argument is that there is no motivation for the suggested combination in any of the prior art references.

First, Appellant argues that the Evans reference does not suggest any motivation and that Examiner's statement regarding the use of attenuators as being "well known in the art and are widely used to reduce noise levels" is false. Appellant cites the text of Introduction to Communication Systems (Appendix A of Appellant Brief) for support his contention that attenuators do not reduce noise, relying particularly on Example 4.4.6 where the formula states that:

$$\text{Noise Figure } (F) = \text{Attenuation } (\alpha).$$

As a result, Appellant interprets this to show that as attenuation increases, noise increases.

Examiner notes that this is a misinterpretation of the teaching. From the text, we see that F does not represent noise, but rather, the *noise figure*. The noise figure is associated with amplification noise (see Eq. 4.66) and not output noise, N_o, which we are interested in. As such, the formula does not apply. The equation that does apply is the formula that shows the relationship between N_o and α and this is denoted in Equ. 4.65, where the relationship between N_o and α is an inverse relationship:

$$N_o = 1/\alpha$$

Here, we clearly see that when attenuation, α, increases, noise, N_o, decreases.

Appellant also argues that the Evans reference cannot be relied upon to provide requisite motivation because there are fundamental differences between the electrical circuit of Evans and the heterodyne detection system of the claimed invention. Appellant supports his contention be saying that the relationship of input signal intensity noise, I_N, to the power of the input signal, P_S is:

$$I_N \alpha P_S$$

Appellant adds that the relationship of the intensity of the heterodyne signal, I_H, is different because it is proportional to the square root of the input signal, P_S:

$$I_H \alpha (P_S)^{1/2}$$

However, Examiner also notes that this line of reasoning does not change the fact that the input signal intensity noise and the heterodyne signal intensity are proportional to the power of the input signal. While Appellant argues that the relationships are different, the signal to noise ratio of the heterodyne signal (I_H/I_N), in fact, does not increase as Appellant suggests. For instance, if the equation is rewritten this way:

$$I_H/I_N \alpha ((P_S)^{1/2}/P_S)$$

arbitrarily substituting any increasing value for P_S, we will notice that the ratio will continue to decrease. This decrease is representative of the a relationship that is consistent with the circuit taught by Evans. Thus, Appellant is in error when he asserts that this relationship does not provide motivation for the suggested combination.

Second, Appellant also argues that the Hasegawa and the Sorin references do not suggest motivation to combine the references. Appellant asserts that Hasegawa's

teaching that "the noise intensity from the input signal is usually a dominant noise source" (fig. 8, ref. 62) simply points out the existence of an attenuator is not suggestive for combination. Furthermore, Appellant admits he does not understand how this teaching is relevant. Examiner notes that the importance of this teaching is not to directly show a combination of Hasegawa's attenuator with Sorin's invention, but rather, to provide a reason to rearrange the attenuator of Sorin so as to place it immediately after the input. As the Appellant admits in Response filed July 15, 2003, the Sorin reference is clear in teaching that "attenuation can be used at different locations within an optical system to improve signal to noise ratio" and that the "location and use of attenuation within an optical system may differ depending on the specifics of the system (pg. 9, lines 15-17). Accordingly, Examiner's point is that one of ordinary skill in the art would recognize that an attenuator is not only able to reduce noise levels or maximize signal to noise ratio, but able to do so at the input or the dominant noise source as suggested by Hasegawa. For this reason, in further in light of the teaching in Evans, there is clearly sufficient motivation to suggest combination.

Therefore, when the teachings of the AAPA, Sorin, Hasegawa, and Evans references are taken together, there is more than sufficient motivation to compel one of ordinary skill in the art to suggest the combination.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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February 20, 2004

Conferees

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